

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/10419

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ H05K7/20, F25D1/00, F25D9/00, G06F1/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl⁷ H05K7/20, F25D1/00, F25D9/00, G06F1/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Toroku Jitsuyo Shinan Koho	1994-2003
Kokai Jitsuyo Shinan Koho	1971-2003	Jitsuyo Shinan Toroku Koho	1996-2003

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 8-186388 A (Fuji Electric Co., Ltd.), 16 July, 1996 (16.07.96), Full text; all drawings (Family: none)	1, 2, 6, 33 3-5, 7, 20, 21, 31, 32
X Y	JP 2001-133174 A (Toyota Motor Corp.), 18 May, 2001 (18.05.01), Full text; all drawings (Family: none)	1-4, 33 6, 7, 20, 21, 31, 32
Y	JP 6-310889 A (Mitsubishi Electric Corp.), 04 November, 1994 (04.11.94), Full text; all drawings (Family: none)	1-7, 31-33

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 25 November, 2003 (25.11.03)	Date of mailing of the international search report 09 December, 2003 (09.12.03)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 7-322640 A (Denso Corp.), 08 December, 1995 (08.12.95), Full text; all drawings (Family: none)	5
Y	US 6062302 A (LUCENT TECHNOLOGIES INC.), 16 May, 2000 (16.05.00), Full text; all drawings & JP 11-163237 A	5
Y	WO 92/19027 A1 (THE UNITED STATES DEPARTMENT OF ENERGY), 29 October, 1992 (29.10.92), Full text; all drawings & JP 5-508265 A	20, 21
Y	US 5057908 A (IOWA STATE UNIVERSITY RESEARCH), 15 October, 1991 (15.10.91), Full text; all drawings & JP 6-318654 A	20, 21

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Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Our search has found that the invention in claim 1 is disclosed in, for example, document JP 8-186388 A (Fuji Electric Co., Ltd.), 16 July, 1996 (16.07.96) and document JP 2001-133174 A (Toyota Motor Corp.) 18 May, 2001 (18.05.01), and it is evidently not novel.

Therefore, there exists no "special technical feature" common to inventions in claims 1 to 33 within the meaning of PCT Rule 13.2.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-7, 20-21, 31-33

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.